



## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/005751

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 3-13 as originally filed/furnished
- pages\* 1, 1a, 2 received by this Authority on 19.04.2005 by fax
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. 2-8 as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* 1 received by this Authority on 19.04.2004 by fax
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1/6-6/6 as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	2-8	YES
	Claims	1	NO
Inventive step (IS)	Claims		YES
	Claims	1-8	NO
Industrial applicability (IA)	Claims	1-8	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
1	This report makes reference to the following documents:		
	D1: WO 02/13307 A (ERICSSON TELEFON AB L M; EGOROV IGOR (SE)) 14 February 2002		
	D2: EP-A-1 011 167 (MATSUSHITA ELECTRIC IND CO LTD) 21 June 2000		
	D3: US 2001/050636 A1 (WEINBERGER MARTIN) 13 December 2001		
2.	The amendments which were submitted on 19 April 2005 with the demand for international preliminary examination and in response to the written opinion of the international searching authority were used as the basis for the international preliminary report on the patentability of the application.		
	The examiner has carefully studied the amendments and the arguments put forward by the applicant concerning the novelty and inventive step in the current application in relation to the prior art and remains of the opinion that the current application does not meet the requirements of PCT		

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	<p>Article 33(1). The reasons are as follows:</p>
3	<p>INDEPENDENT CLAIM 1</p>
3.1	<p>The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claim 1 lacks novelty (PCT Article 33(2)). Document D1 discloses (the references between parentheses refer to that document):</p> <p>a PIFA antenna arrangement (fig. 5) for at least two mobile telephone frequency bands (GSM/DCS; GSM/PCS) at a distance from one another, comprising a ground connection and an HF feed connection, wherein:</p> <ul style="list-style-type: none"><li>- the PIFA antenna arrangement comprises at least two strip-like antenna branches (510; 520) that run essentially side-by-side and in parallel to one another and which are connected one to the other at a base point (500) in order to serially connect the antenna branches (510; 520);</li><li>- the antenna branches (510; 520) extend at a predetermined distance from one another to form a slot (550);</li><li>- the antenna branches (510; 520) have straight sections;</li><li>- the ground connection (540) is disposed on a free end of one of the antenna branches (510);</li><li>- the HF feed connection (530) is disposed on</li></ul>

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- the outer edge of the antenna branch (510) of the PIFA antenna structure on which the ground connection (G) lies; and wherein
- the widths of the antenna branches (510; 520), the lengths of the antenna branches (510; 520) and the slot (550) between the antenna branches (510; 520) are calculated such that the PIFA antenna structure, as a result of the capacitive coupling between the antenna branches (510; 520), has two resonance frequency bands at a desired distance from one another (see page 10, line 32 - page 11, line 7).

- 3.2 The applicant sees the main reason for the novelty of the current application in relation to the prior art in D1 as being the fact that the PIFA antenna has two resonance frequencies at a desired distance from one another **as a result of the capacitive coupling between the two branches.**

It is clear, however, from the description (see page 7, lines 6-17), and from figure 2 and claim 1 (see lines 23-25), that the resonance of the PIFA antenna in two different frequencies is due not "only" to the capacitive coupling (C3 in fig. 2) between the two branches (Z2, Z2), but "also" due to the parameters W1, W2, B1, B2, T, H1 and to the distance between the ground point G and the HF feed S, or due to L1, C1, L2, C2.

The description even shows (see page 3, lines 18-

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22) that the capacitive coupling C3 with the inductive coupling L3 are important to the bandwidth of the resonance frequencies.

- 3.3 In addition, even if it is assumed that change to all those parameters is used only for the purpose of capacitive coupling between the branches (Z1, Z2) and results in an antenna resonance in two different frequencies, it is no different in the antenna (500) in document D1. Document D1 states clearly on page 10, line 32 to page 11, line 7, that the lengths and widths of the branches (510, 520) and the width of the slot (550) between the branches (510, 520) sets the resonance of the antenna (500) at two different frequencies. Reference was also made to this passage in the written opinion of the international searching authority.

It is also clear to a person skilled in the art that a slot width of 1 to 3 mm (see document D1, page 10, lines 9-11) and frequencies of 900 to 1900 MHz result in a very strong and significant capacitive coupling which contributes to the resonance frequency.

- 3.4 The applicant incorrectly views the prior art antenna from document D1 as a combination of a patch antenna part and a strip-like antenna part.

In interpreting the length of the antenna 500 in D1, the applicant has not considered the actually

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intended total length of the branches (510, 520), but simply the length of the branch (510), or the width (W) of the antenna (see also page 10, lines 6 and 7 together with page 13, lines 5 and 6).

If the formula  $L=\lambda_1/4=3\lambda_2/4$  is taken, the length  $\lambda_2/4$  would go beyond the diagonal of the "patch part".

4      DEPENDENT CLAIMS 2-8

The applicant has not put forward any argument concerning the inventive step in claims 2-8 which goes beyond the arguments indicated above relating to the novelty of claim 1.

Consequently, as before, dependent claims 2-8 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT requirements for inventive step, since claim 1 still lacks novelty and those additional features are known from document D1 in combination with document D2.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- 1 The application does not meet the requirements of PCT Article 6 because claims 1, 5 and 6 are unclear:
  - 1.2 The wording used in lines 32-36 of claim 6 is vague and unclear and leaves the reader uncertain as to the meaning of the technical features in question. As a result, the subject matter of said claim is not clearly defined (PCT Article 6).

This lack of clarity could be overcome, for example by using the wording employed in the description (page 11, lines 14-16 and page 12, lines 31-36).
  - 1.3 The term "substantially" in claims 1 and 5 is vague and unclear. As a result, the subject matter of said claims is not clearly defined (PCT Article 6).